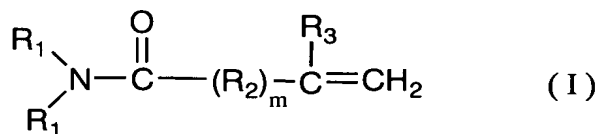


CLAIMS

1. An over-coating agent for forming fine patterns which is applied to cover a substrate having photoresist patterns thereon and allowed to shrink under heat so that the spacing between adjacent photoresist patterns is lessened, with the applied film of the over-coating agent being removed substantially completely to form fine patterns, further characterized by containing a water-soluble polymer and an amide group-containing monomer.

2. The over-coating agent for forming fine patterns according to claim 1, wherein the amide group-containing monomer is an amide compound which is represented by the general formula (I):



where R_1 is a hydrogen atom, an alkyl or hydroxyalkyl group having 1-5 carbon atoms; R_2 is an alkyl group having 1-5 carbon atoms; R_3 is a hydrogen atom or a methyl group; and m is a number of 0-5.

3. The over-coating agent for forming fine patterns according to claim 2, wherein in the general formula (I), R_1 is a hydrogen atom, a methyl group or an ethyl group; and m is 0.

4. The over-coating agent for forming fine patterns according to claim 1, wherein the amide group-containing monomer is acrylamide and/or methacrylamide.

5. The over-coating agent for forming fine patterns ac-

cording to claim 1, which contains 0.1 - 30 mass% of the amide group-containing monomer in the over-coating agent (as solids).

6. The over-coating agent for forming fine patterns according to claim 1, wherein the water-soluble polymer is at least one member selected from the group consisting of alkylene glycolic polymers, cellulosic derivatives, vinyl polymers, acrylic polymers, urea polymers, epoxy polymers, melamine polymers and amide polymers.

7. The over-coating agent for forming fine patterns according to claim 1, wherein the water-soluble polymer is at least one member selected from the group consisting of alkylene glycolic polymers, cellulosic derivatives, vinyl polymers and acrylic polymers.

8. An over-coating agent for forming fine patterns which is applied to cover a substrate having photoresist patterns thereon and allowed to shrink under heat so that the spacing between adjacent photoresist patterns is lessened, with the applied film of the over-coating agent being removed substantially completely to form fine patterns, further characterized by containing a water-soluble polymer which contains at least (meth)acrylamide as its monomeric component.

9. The over-coating agent for forming fine patterns according to claim 8, wherein the water-soluble polymer is a copolymer of (meth)acrylamide and at least one member selected from among monomeric components of alkylene glycolic polymers, cellulosic derivatives, vinyl polymers, acrylic polymers, urea polymers, epoxy polymers and melamine polymers,

with the proviso that monomeric components of acrylic polymers are those other than (meth)acrylamide.

10. The over-coating agent for forming fine patterns according to claim 8, wherein the water-soluble polymer is a
5 copolymer or a mixture of (meth)acrylamide and at least one member of polymers selected from the group consisting of alkylene glycolic polymers, cellulosic derivatives, vinyl polymers, acrylic polymers (with the exception of poly(meth)acrylamide), urea polymers, epoxy polymers and
10 melamine polymers.

11. The over-coating agent for forming fine patterns according to claim 8, wherein the water-soluble polymer is a copolymer of (meth)acrylamide and at least one member selected from among monomeric components of acrylic polymers.

15 12. The over-coating agent for forming fine patterns according to claim 8, wherein the water-soluble polymer is a copolymer or a mixture of poly(meth)acrylamide and acrylic polymers.

20 13. The over-coating agent for forming fine patterns according to claim 9, wherein the monomeric component of acrylic polymers is (meth)acrylic acid.

14. The over-coating agent for forming fine patterns according to claim 11, wherein the monomeric component of acrylic polymers is (meth)acrylic acid.

25 15. The over-coating agent for forming fine patterns according to claim 10, wherein acrylic polymers are poly(meth)acrylate.

16. The over-coating agent for forming fine patterns ac-

according to claim 12, wherein acrylic polymers are poly(meth)acrylate.

17. The over-coating agent for forming fine patterns according to claim 8 or 9, which is an aqueous solution having a concentration of 3 - 50 mass%.

18. A method of forming fine patterns comprising the steps of covering a substrate having thereon photoresist patterns with the over-coating agent for forming fine patterns of any one of claims 1, 8 or 9, then applying heat treatment to shrink the applied over-coating agent under the action of heat so that the spacing between the adjacent photoresist patterns is lessened, and subsequently completely removing the applied film of the over-coating agent.

19. The method of forming fine patterns according to claim 18, wherein the heat treatment is performed by heating the substrate at a temperature that does not cause thermal fluidizing of the photoresist patterns on the substrate.